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(54) Semiconductor device capable of being connected as a single ended push-pull amplifier

(57) A semiconductor device capable of maintaining good temperature compensation and reducing manufacture works of SEPP connecting NPN and PNP power transistors and temperature compensating and biasing circuits. A first semiconductor device has an ordinary bias diode formed on the same semiconductor substrate as an NPN power transistor. A second semiconductor device has one or a plurality of Schottky barrier type diodes formed on the same semiconductor substrate as a PNP power transistor. The forward voltage drop V_1 of the diode is set to an arbitrary constant value smaller than E exclusive of about E/2, and the total forward voltage drop V_2 of the Schottky barrier diode or diodes is set to a predetermined value of about (E - V_1), where E is a total forward voltage drop between the bases and emitters of the NPN and PNP power transistors.

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EUROPEAN SEARCH REPORT

Application Number
EP 97 10 8477

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	10 December 2003	Kurzbauer, W

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
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D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-13

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-13

NPN transistor and PNP transistor formed on two separate substrates and on each substrate one or a plurality of serially connected diodes are formed which are connected to the base of the NPN and PNP transistors respectively.

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2. claims: 14-26

NPN transistor and PNP transistor formed on two separate substrates and on each substrate a bias transistor is formed across the base of the NPN or PNP transistor and a bias terminal.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 97 10 8477

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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10-12-2003

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82